UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
2004/0008

March 15, 2004

Karyn L. Wood
Forest Supervisor
Wallowa-Whitman National Forest
1550 Dewey Ave.
P.O. Box 97814
Baker City, OR 97814

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery and Conservation Management Act Essential Fish Habitat Consultation on the Effects of the Proposed Anthony Lakes Highway (FS Road 73) Road Reconstruction, Crawfish Creek, Crane Creek, Granite Creek, North Fork John Day River, North Fork John Day River Subbasin, Baker and Grant Counties, Oregon

Dear Ms. Wood:

Enclosed is a document prepared by NOAA's National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act on the effects of United States Department of Agriculture (USDA) Forest Service Anthony Lakes Highway (Forest Service Road 73) Reconstruction Projects. NOAA Fisheries concludes in the biological opinion included in this document that the proposed actions are not likely to jeopardize Middle Columbia River (MCR) steelhead (*Oncorhynchus mykiss*). As required by section 7, NOAA Fisheries also includes reasonable and prudent measures with non-discretionary terms and conditions that NOAA Fisheries believes are reasonable and appropriate to minimize the impact of incidental take associated with these actions.

This document also serves as consultation on essential fish habitats (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects to EFH. Section 305(b)(4)(B) of the MSA requires Federal agencies to provide a detailed written response to NOAA Fisheries within 30-days after receiving these recommendations. If the response is inconsistent with the recommendations, the action agency must explain why the recommendations will not be followed, including the justification for any disagreements over the effects of the action and the recommendations.

If you have any questions regarding this consultation please contact Eric Murray of my staff in the Eastern Oregon Branch of the Oregon State Habitat Office, at 541.975.1835, ext. 222.

Sincerely,

for Michael R Crouse

D. Robert Lohn
Regional Administrator

cc: Alan Scott, UNF
John Kinney, USFWS
Tim Unterwegner, ODFW

Endangered Species Act - Section 7 Consultation
Biological Opinion

&

Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat Consultation

Anthony Lakes Highway (FS Road 73) Road Reconstruction,
Crawfish Creek, Crane Creek, Granite Creek, North Fork John Day River
North Fork John Day River Subbasin,
Baker and Grant Counties, Oregon

Agency:	USDA Forest Service
Consultation Conducted By:	National Marine Fisheries Service, Northwest Region
Date Issued:	March 15, 2004
Issued by:	for Michael R Course D. Robert Lohn Regional Administrator
Refer to:	**2004/00008**

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1. INTRODUCTION

The Endangered Species Act (ESA) of 1973 (16 USC 1531-1544), as amended, establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with NOAA's National Marine Fisheries Service (NOAA Fisheries) and U.S. Fish and Wildlife Service (together "Services"), as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitats. This biological opinion (Opinion) is the product of an interagency consultation pursuant to section 7(a)(2) of the ESA and implementing regulations 50 CFR 402.

The analysis also fulfills the essential fish habitat (EFH) requirements under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (section 305(b)(2)).

The USDA Forest Service, Wallowa Whitman National Forest (WWNF) proposes to carry out the Anthony Lakes Highway (Forest Service (FS) Road 73) Reconstruction Project. The administrative record for this consultation is on file at the Oregon State Habitat Office.

1.1 Background and Consultation History

NOAA Fisheries received a letter requesting formal ESA section 7 consultation on the Anthony Lakes Highway (FS Road 73) Reconstruction Project on January 12, 2004. A complete biological assessment (BA) and essential fish habitat (EFH) assessment for this project were also received at this time and consultation was initiated. Early consultation for this project followed the process described in the *Streamlining Consultation Procedures Under Section 7 of the Endangered Species Act* (USDA Forest Service, NOAA Fisheries, Bureau of Land Management, and U.S. Fish and Wildlife Service 1999). As such, NOAA Fisheries reviewed drafts of the BA and provided comments before final submission.

FS Road 73 is a paved, two-lane road with two 10-foot wide travel lanes with 1-foot paved shoulders. It is an important element in the National Forest and Oregon State highway infrastructure. It has a high level of recreational use (approximately 40,000 visitors in the winter of 1999 to 2000), and is an essential route connecting the communities of Baker City, Sumpter, Granite, Ukiah, and La Grande. Recreational traffic is heavy on this road and is expected to increase as the Sumpter Valley Railroad, the historic town site of Granite, and the expansion of the Anthony Lakes Ski Area develop. Summer homes near Anthony Lakes, private land in Crane Flats, and commercial mining activities near Granite are also accessed via this road.

In its current state, FS Road 73 does not meet the Highway Safety Act or National Forest standards for its current classification as a maintenance level 5, traffic service level A road. These roads are to be constructed and maintained for high speed passenger vehicle use; meaning that users should experience a safe, smooth ride in low-clearance passenger vehicles at the speeds the road was designed and constructed to accommodate. The proposed project involves resurfacing the road, stabilizing cut slopes, constructing interpretive sites, and improving or replacing stream-crossing structures such as culverts and bridges.

The project area under consideration encompasses approximately 34 miles of FS Road 73 in its present location from the end of Baker County Road 1146 to Grant County Road 24 near the town of Granite. This area is within the Whitman Unit of the WWNF. A large portion of the proposed project is in the Powder River subbasin. Since the construction of Hells Canyon Dam on the Snake River, anadromous salmonids have been extirpated from the Powder River subbasin. The remaining portion of the project is within the North Fork John Day River (NFJDR), which is within the range of MCR steelhead and is designated EFH for chinook salmon. Therefore, only the portion of the proposed project that is in the NFJDR subbasin will be considered in this consultation.

The objective of the Opinion contained in this document is to determine whether the Anthony Lakes Highway (FS Road 73) Reconstruction Project is likely to jeopardize the continued existence of MCR steelhead.

The replacement of a bridge that crosses the NFJDR is an interdependent action associated with this project. Implementing regulations of the ESA define interdependent actions as "those that have no independent utility apart from the action under consideration" (50 CFR 402.02). NOAA Fisheries completed consultation on the bridge replacement in a previous biological opinion on proposed and ongoing Forest Service and Bureau of Land Management (BLM) activities in the NFJDR subbasin (NOAA Fisheries Nos.: 2000/01495, regarding "not likely to adversely affect" actions, and 2000/01496, regarding "likely to adversely affect" actions).[1] Due to the interdependent nature of the bridge replacement on the Anthony Lakes Highway (FS Road 73) Reconstruction Project, this Opinion will include the effects of both the bridge replacement and the road reconstruction project in the jeopardy analysis to properly assess the aggregate effects of the two actions. This Opinion does not supplant the original consultation on the bridge replacement.

The objective of the EFH consultation is to determine whether the Anthony Lakes Highway (FS Road 73) Reconstruction Project may adversely affect designated EFH for relevant species, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH resulting from the action.

[1] Available at :http://www.nwr.noaa.gov/1publcat/bo/2003/200001496_FY2013_johnday_08-26-2003.pdf

1.2 Proposed Action

Proposed actions are defined in the Services' consultation regulations (50 CFR 402.02) as "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas." Additionally, U.S. Code (16 U.S.C. 1855(b)(2)) further defines a Federal action as "any action authorized, funded, or undertaken or proposed to be authorized, funded, or undertaken by a Federal agency." Because the WWNF proposes to carry out the Anthony Lakes Highway (FS Road 73) Reconstruction Project that may affect listed resources, it must consult under ESA section 7(a)(2) and MSA section 305(b)(2).

The Anthony Lakes Highway (FS Road 73) Reconstruction Project involves the following activities in the NFJDR subbasin:

- Replacement of subgrade and resurfacing FS Road 73.
- Replacement of culverts on Crawfish and Granite Creek and addition of drainage structures.
- Stabilization of cut slopes and landslide areas along FS Road 73.
- Construction of interpretive sites or recreational opportunities.

The activities are fully described in the BA and are summarized below. Those activities from milepost (MP) 13.0 to 33.8 are within the range of MCR steelhead.

Replacement of Subgrade and Resurfacing

A new surface will be placed over the entire length of FS Road 73. The treatment method may be a chip-seal or pavement overlay. A new 1-foot wide aggregate shoulder will be constructed beside the paved running surface. This work will be confined to the existing edge of pavement and shoulder.

Subgrade treatments will be limited to the sections of FS Road 73 from milepost (MP) 26.0 to 28.958. These sections are deteriorating due to lack of sub-grade structure. The treatments will include removing the existing unsuitable sub-grade material and hauling to disposal areas. A new structure will be placed using a pit-run (crushed rock) base, with or without geotextiles to provide an adequate base to support the new running surface. This work will be confined to the existing traveled way. Water for this activity or other construction efforts will be drafted from the NFJDR, Granite Creek, and Crawfish Creek.

Replacement of Culverts on Onion, Crane, and Granite Creeks and Addition of Drainage Structures

Three major culverts will be replaced with open-bottom arches. These are at MP 30.2, 31, and 33.4. Replacing these structures will require substantial (up to 20,000 cubic yards total) fill removal and replacement. The culvert at MP 30.2 is on Onion Creek, and will be replaced by removing the existing fill and culvert pipe with an excavator and replacing it with a bottomless arch culvert and replacing the fill material. The road over the section would then be subgraded

and paved. The culvert at MP 31 is on Crane Creek and will be replaced by a similar method. The culvert at MP 33.4 is on Granite Creek and will be removed with a trenchless technology system that will involve placing heavy equipment next to the existing pipe, boring through the fill material, and replacing the pipe with the new bottomless arch. No work area isolation or fish salvage is planned as part of the project.[2] The WWNF feels that the chance of fish being present at the work sites is low and any fish present will leave the work area when construction activities begin.

Additionally, numerous ditch relief culverts will be installed to decrease the amount of surface and subsurface flow captured by the road. These culverts are designed to reduce the amount of overland water flow intercepted by the road ditches and are not in streams. This work will be accomplished within the existing road template down to the existing fill slope toe.

Stabilization of Cut Slopes and Landslide Areas Along the 73 Road

A landslide between MP 32.864 and 32.988 (also know as the Granite Slide) of the 73 road will be stabilized. The cutslope and fillslope of the road at this location would be buttressed with riprap to stabilize and support the roadway. A rock drain at the toe of the cutslope would be installed to carry ground water away from the site.

Construction of Interpretive Sites or Recreational Opportunities

A turnout and interpretive site will be created between MP 15.5 and 16.5. This area overlooks an area burned by a recent wildfire and is far from any riparian habitat conservation area (RHCA).[3] Some minor excavation and clearing will be required to create this site, but this activity is not expected to have any effect to MCR steelhead habitat.

An existing turnout at MP 32.641 will be enlarged by removing the through-cut on the creek side of the road. The removal of the through-cut will provide adequate space for a turnout and an interpretive site for the Chinese Walls, a historic mining site. This site will be in the RHCA of Granite Creek, but the activity will move the road further away from the creek.

Conservation Measures for the Project

The WWNF included the following conservation measures in the design of the Anthony Lakes Highway (FS Road 73) Reconstruction Project:

- NOAA Fisheries-approved screens will be used during all water removal and drafting operations.

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[2] Telephone Conversation with Alan Scott, UNF (December 3, 2003), regarding culvert design

[3] Riparian Habitat Conservation Area (RHCA) - Portions of watersheds where riparian dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines. RHCAs include traditional riparian corridors, wetlands, intermittent headwater streams, and other areas where proper ecological functioning is crucial to maintenance of the stream's water, sediment, woody debris and nutrient delivery systems. (USDA and U.S.D.I 1995)

- Best management practices will be used to meet Oregon State Water Quality standards during all construction operations.
- Sediment control measures will be used below all ditch relief culvert installation to prevent downhill movement of sediment that may reach nearby streams.
- Straw bales, silt fences, or bog mats will be used to control sediment at instream culvert replacement sites.
- Sediment control measures will be used at the landslide stabilization site.
- Any hazard trees felled along FS Road 73 will be discussed with the Forest Service district fishery biologist and watershed specialist. These trees will be placed in streams to add large woody debris where possible.
- Instream construction activities will be conducted during the in-water work window of July 15 to August 15.
- Highly disturbed areas will be seeded with certified weed-free seed mix.

Isolation of Construction Activities from Stream Flow

The rerouting of stream flows will isolate the project work from the stream. This process will involve removing aquatic organisms from the project site, and includes the construction of water diversion structures. These structures may be designed to reroute flows around the project site and outside of the channel or simply shift flows within the existing channel. The water diversion structures may include appropriately designed or screened dams, dikes, and culverts. Expected impacts include the temporary isolation of stream habitat from access by fish and aquatic organisms, temporary impairment of fish movement upstream and downstream of the project, removal of riparian vegetation, and exposure of bare ground. Applied conservation measures for isolating the construction from stream flow include working during the state's recommended in-water work widows, using appropriate fish handling and transfer protocols, applying erosion and pollution control, minimizing heavy equipment use and fuel/oil leakage, minimizing earthmoving related erosion, minimizing stream crossing sedimentation, and minimizing sedimentation through dewatering.

Project Monitoring

The WWNF plans to carry out the following monitoring for this project:

- Implementation monitoring will be conducted to ensure that conservation measures are being implemented and are effective in meeting resource objectives. If problems are discovered, activity will cease until the problem is corrected.
- WWNF staff will monitor the project area for noxious weed infestations.
- A walk-through survey of the project area during implementation and after project completion will be conducted to qualitatively monitor onsite and downstream effects of project implementation. WWNF fisheries and watershed staff will monitor the effectiveness of meeting riparian and fisheries objectives such as improving channel morphology, creating riparian vegetation and instream structures, and reducing sediment transport.

2. ENDANGERED SPECIES ACT

2.1 Biological Opinion

2.1.1 Biological Information

The MCR steelhead evolutionarily significant unit (ESU) was listed as threatened under the ESA by NOAA Fisheries on March 25, 1999 (64 FR 14517). Protective regulations for MCR steelhead were issued under section 4(d) of the ESA on July 10, 2000 (65 FR 42422). Biological information concerning the MCR steelhead is found in Busby *et al.* (1996). The major drainages in the MCR steelhead ESU are the Deschutes, John Day, Klickitat, Umatilla, Walla Walla, and Yakima river systems. NOAA Fisheries (2003) has indicated that the five-year average (geometric mean) abundance of natural MCR steelhead was up from previous years' basin estimates in the ESU. The Klickitat, Yakima, Touchet, and Umatilla systems are all well below their interim abundance targets (Table 1). The John Day and Deschutes are at or above their interim targets for abundance, however there is significant concern regarding the straying of fish into the Deschutes system from other ESUs (Table 1). The productivity estimate (λ) of the MCR ESU is approximately 0.98, indicating that the productivity of MCR steelhead is slightly below its target of 1.0. NOAA Fisheries' biological review team (BRT) has determined that the MCR ESU is likely to become endangered because of stock abundance and long-term productivity being depressed within the ESU.

The John Day River (JDR) is the largest river system in the range of MCR steelhead that is free of dams. There is currently no artificial propagation of steelhead in the system, and runs are driven almost exclusively by native stocks, making the JDR system unique within the ESU. However, there is some straying of hatchery fish into the JDR system from the Columbia River (Unterwegner and Gray 1997). The Oregon Department of Fish and Wildlife (ODFW) estimates yearly returns of adult steelhead to the JDR basin from 3,900 to 36,400, with estimated escapement averaging 13,988 adults since 1987. NOAA Fisheries (2003) states that while the JDR system has met or exceeded interim abundance targets for the last five years, the long-term trend for abundance is still downward.

Table 1. Interim Abundance Targets for the MCR Steelhead ESU (adapted from NOAA Fisheries 2003).

ESU/Spawning Aggregations*	Interim Abundance Targets	Interim Productivity Objective
Walla-Walla	2,600	Middle Columbia ESU populations are well below recovery levels. The geometric mean Natural Replacement Rate (NRR) will therefore need to be greater than 1.0
Umatilla	2,300	
Deschutes (Below Pelton Dam Complex)	6,300	
John Day		
North Fork	**2,700**	
Middle Fork	1,300	
South Fork	600	
Lower John Day	3,200	
Upper John Day	2,000	

*Population in bold is addressed in this Opinion

Trend data for MCR steelhead in the NFJDR show a decline in the MCR steelhead population. Forest Service BAs for this area reference a decline in steelhead production, while Busby *et al.* (1999) notes a short-term decline of -1.2 %, and a long-term decline of -2.5%. Busby *et al.* (1999) also note that the overall decline of MCR steelhead in the JDR basin is of particular concern because the basin has historically supported the largest population of native, naturally-spawning summer steelhead in the MCR ESU. The current population status and trends for MCR steelhead are described in Busby *et al.* (1996), NOAA Fisheries (1997), and NOAA Fisheries (1999b). Annually declining trends of -1.2% in the short term, and -2.5% in the long term were noted for MCR steelhead in the NFJDR (NOAA Fisheries, 1999b).

According to the BA, MCR steelhead adults enter the John Day River as early as September, with peak migration in October, depending on water temperature. Spawning in the John Day basin occurs from March to mid-June. Fry emergence timing depends on time of spawning and water temperature during egg incubation, but usually occurs from late May through June. Essential features of the adult spawning, juvenile rearing, and adult and juvenile migratory habitat for the species are: (1) Substrate, (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) food (juvenile only), (8) riparian vegetation, (9) space, and 10) safe passage conditions (Bjornn and Reiser, 1991; NOAA Fisheries, 1996b; Spence *et.al.*, 1996). The proposed and ongoing actions addressed in this Opinion may affect all of the above factors.

2.1.2 Evaluating Proposed Actions

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR Part 402 (the consultation regulations). In conducting analyses of habitat-altering actions under section 7 of the ESA, NOAA Fisheries uses the following steps: (1) Consider the status and biological requirements of the species; (2) evaluate the relevance of the environmental baseline in the action area to the species' current status; (3) determine the effects of the proposed or continuing action on the species; (4) consider cumulative effects; and (5) determine whether the proposed action, in light of the above factors, is likely to appreciably reduce the likelihood of species survival in the wild or adversely modify its critical habitat. In completing this step of the analysis, NOAA Fisheries determines whether the action under consultation, together with all cumulative effects when added to the environmental baseline, is likely to jeopardize the continued existence of the ESA-listed species or result in destruction, adversely modify their critical habitat, or both.

NOAA Fisheries has developed guidelines for basin-level, multispecies recovery planning on which individual, species-specific recovery plans can be founded. "Basin-level" encompasses habitat, harvest, hatcheries, and hydro. The recovery planning analysis is contained in the document entitled "*Conservation of Columbia Basin Fish: Final Basinwide Salmon Recovery Strategy*" (hereafter, the Basinwide Recovery Strategy [Federal Caucus 2000]). The Basinwide Recovery Strategy will be used to guide recovery planing for MCR steelhead. The recovery plan will provide the particular statutorily required elements of recovery goals, criteria, management actions, and time estimates that are not developed in the Basinwide Recovery Strategy.

Among other things, the Basinwide Recovery Strategy calls for restoration of degraded habitats on a priority basis to produce significant measurable benefits for listed anadromous and resident fish. Immediate and long-term priorities for restoration measures relevant to this consultation include the following general habitat improvements for tributary reaches:

- Restoring tributary flows.
- Addressing passage obstructions.
- Protecting the productive habitat.
- Increasing the amount of habitat.
- Improving water quality.

The Basinwide Recovery Strategy also established this specific habitat improvement action priority for the JDR Basin:

- Fix flow, screening, and passage problems in priority subbasins...in the...JDR Basin.

Until the species-specific recovery plans are developed, the Basinwide Recovery Strategy provides the best guidance for judging the significance of an individual action relative to the species-level biological requirements.

2.1.3 Biological Requirements

The first step the NOAA Fisheries uses when applying the ESA section 7(a)(2) to listed steelhead is to define the species' biological requirements that are most relevant to each consultation. NOAA Fisheries also considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. To assess the current status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list MCR steelhead for ESA protection and also considers new data available that is relevant to the determination.

For this consultation, the biological requirements are improved habitat characteristics that function to support successful adult and juvenile migration, spawning and rearing. MCR steelhead survival in the wild depends on the proper functioning of certain ecosystem processes, including habitat formation and maintenance. Restoring functional habitats depends largely on allowing natural processes to increase their ecological function, while at the same time removing adverse impacts of current practices. In conducting analyses of habitat-altering actions and essential habitat elements, NOAA Fisheries defines the biological requirements in terms of a concept called Properly Functioning Condition (PFC) and uses a "habitat approach" in its analysis (NOAA Fisheries 1999). The current status of the MCR steelhead, has improved somewhat since the species was listed. Adult MCR steelhead returns to the John Day River basin have increased since the listing in 1999. However, there still remains numerous habitat related problems throughout the basin, with habitat alteration from past mining activities and high summer water temperatures being key limiting factors in the NFJDR.

2.1.4 Environmental Baseline

The environmental baseline is an analysis of the effects of past and ongoing human-caused and natural factors leading to the current status of the species or its habitat and ecosystem within the action area. The "action area" is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR 402.02). The action area for this consultation is the construction areas in the Upper NFJDR and Granite Creek watersheds in the NFJDR subbasin and the downstream extent of turbidity cause by the proposed actions– approximately one mile below the disturbance.

The NFJDR subbasin is contained within the JDR basin and contributes over 60% of the average annual discharge for the basin. The JDR is the longest free-flowing (*i.e.*, non-dammed) river with wild anadromous salmonid stocks in the Columbia River basin. Federal land ownership is approximately 63% (Forest Service– 60%, and BLM– 3%), and over 33% of the subbasin is privately owned. The State of Oregon manages approximately 2%, while other ownership also amounts to about 2%. Approximately 77% of the subbasin is forested land, and rangeland and pasture land accounts for about 20%. The remaining portion of the subbasin is cropland and irrigated agriculture.

In general, the current status of MCR steelhead populations is the result of several long-term, human-induced factors (*e.g.* habitat degradation, water diversions, hydropower dams). Within the action area, habitat degradation has occurred from timber harvest, road construction, mining, and livestock grazing.

Environmental baseline conditions within the action area were evaluated for the subject actions at the subbasin and watershed scale. The results of this evaluation, based on the "matrix of pathways and indicators" (MPI) described in *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NOAA Fisheries 1996), follow. This method assesses the current condition of instream, riparian, and watershed factors that collectively provide properly functioning aquatic habitat essential for the survival and recovery of the species.

The information used to establish environmental baseline conditions in this Opinion was taken from the BA as well as from other sources provided by the WWNF and the Umatilla National Forest (UNF), including watershed analyses and environmental impact statements. Additional information on environmental baseline conditions was taken from other BAs prepared by the UNF for land management activities in the action area as well as from state agencies such as the ODFW. A summary of this information can be found in Table 2.

NFJDR Subbasin

In the NFJDR subbasin (4^{th} code Hydrologic Unit Code (HUC)), five habitat indicators in the MPI were rated as "properly functioning" and include: Chemical contaminants/nutrients, physical barriers, large pools, off-channel habitat, and disturbance history. Eleven were rated as "functioning at risk" and include: Sediment, substrate, large woody debris (LWD), pool frequency and quality, refugia, wetted width/maximum depth ratio, streambank condition, floodplain connectivity, change in peak/base flows, drainage network increase, and riparian habitat conservation areas. Two indicators, temperature and road density/location, were rated as "not properly functioning."

Some habitat indicators that were rated as "properly functioning" for the subbasin as a whole, such as chemical contaminant/nutrients may be functioning at a lesser condition in localized areas. For instance, in areas of concentrated mining activities, chemical contaminants such as heavy metals may be present. In addition, a chemical spill in the NFJDR in 1990, resulted in fish kills and reduced densities of aquatic invertebrates. In a similar circumstance, recent wildfires have led to localized increase in peak/base flows and degraded riparian areas by burning hardwood shrubs and other hydrophilic vegetation. NOAA Fisheries recently completed a biological opinion on ongoing and proposed Forest Service and BLM actions in the NFJDR subbasin (NOAA Fisheries Nos.: 2000/01495, regarding "not likely to adversely affect" actions), and 2000/01496, regarding "likely to adversely affect" actions).

Upper NFJDR Watershed (94)

In the Upper NFJDR watershed, substrate and pool frequency and quality were rated as "not properly functioning." Temperature, sediment, chemical contaminants/nutrients, large woody

debris, streambank stability, and drainage network increase were rated as "functioning at risk." Large pools, off-channel habitat, and road density and location were rated as "properly functioning." Physical barriers, wetted width/maximum depth ratio, floodplain connectivity, change in peak/base flows, disturbance history, RHCAs, and disturbance regime were not rated due to inadequate information. Much of this watershed is in the NFJDR Wilderness Area. This watershed has been mined extensively in the past and some mining operations are occurring at the present time. NOAA Fisheries completed a biological opinion on mining activities in this watershed on July 25, 2002 (NOAA Fisheries No.: 2000/01459). The mining activities addressed in this Opinion are considered as part of the environmental baseline for this watershed.

Granite Creek Watershed (93)

In the Granite Creek watershed, floodplain connectivity, road density and location were rated as "not properly functioning." Floodplain connectivity was rated as "not properly functioning" due to the presence of dredge piles from historic mining operations. Many of these historic dredge piles are positioned very near the stream and prevent the stream from overflowing into the floodplain during high flow events. Nine habitat indicators were rated as "functioning at risk" and include: Temperature, sediment, chemical contaminants/nutrients, physical barriers, substrate, LWD, pool frequency and quality, drainage network increase, and RHCAs. Although the WWNF rated chemical contaminants/nutrients as "functioning at risk," waste from abandoned mine sites may be having serious negative effects on water quality in this watershed. ODFW biologists have observed dead fish and adult fish with gill lesions in the streams of this watershed (Wayne Wilson, ODFW, pers. comm.). Although the cause of this mortality is not certain, preliminary results from pathology investigations indicate mercury poisoning may be a contributing factor. Although recent surveys conducted by the UNF and U.S. Environmental Protection Agency (EPA) indicated that mercury was not present in high enough concentrations known to cause these types of effects, conditions at abandoned mine sites and abatement ponds may change yearly, increasing the amount of heavy metals released. Ongoing research may provide more information about this situation in the future.

Large pools, off-channel habitat, wetted width/maximum depth ratio, streambank condition, and disturbance history were rated as "properly functioning." NOAA Fisheries completed a biological opinion on current mining activities in this watershed on July 25, 2003 (NOAA Fisheries No.: 2000/01459). The mining activities addressed in that biological opinion are considered as part of the environmental baseline of this watershed. Refugia, change in peak/base flows, and disturbance regime were not rated due to lack of adequate information. The City of Granite water supply system was consulted on by NOAA Fisheries (NOAA Fisheries No.: 1999/01876). Approximately 1 cubic foot per second (cfs) of water is removed from Granite Creek to provide a municipal water supply.

The Pete Mann ditch system is in the Granite Creek watershed. This complex of ditches was originally constructed in the late 1800s to deliver water to local mines. Currently, the ditch system delivers water to both mines and land irrigated for agriculture. The Pete Mann ditch system often completely diverts Lightning Creek, Salmon Creek, and the East Fork Clear Creek (all MCR steelhead streams) into the Burnt River basin, a non-anadromous basin. Although the

Forest Service did not rate change in peak/base flows, it is likely that this indicator is functioning either "at risk" or "not properly functioning" due to the presence of this ditch system. The Forest Service has provided recent information which indicates that there is a Federal nexus (Special Use Permit) whereby section 7 consultation is required on portions of this ditch system. The UNF included information about this ditch in a previous BA, but later requested that this action be removed. As such, there will be a future Federal action and section 7 consultation to address some portions of this ditch. Currently, portions of the system may be operating without a permit during the irrigation season. At this time, information about the exact amount of flow being removed from the diverted streams is unavailable. This ditch system is in the headwaters of the Granite Creek watershed. The area where the ditch system is present is upstream of the portion of this watershed used by MCR steelhead for spawning and rearing (T. Unterwegner, ODFW, pers. comm.) For this reason, the diversion structures and headgates associated with this ditch system do not serve as passage barriers for MCR steelhead, however, the reduction in flows resulting from the water diversion has negative impacts to the MCR steelhead rearing habitat in this watershed downstream of the diversions.

The UNF and ODFW have recently completed restoration projects in this watershed. These efforts include flattening mine tailing piles to reconnect stream channels with their floodplains, and planting hardwoods in riparian areas.

The biological requirements of the listed species are not currently being met under the environmental baseline. Conditions in the action area would have to improve, and any further degradation of the baseline, or delay in improvement of these conditions would probably further decrease the likelihood of survival and recovery of the listed species under the environmental baseline.

Table 2. Summary of Subbasin and Watershed Conditions in the Action Area*

MPI Pathways	MPI Indicators	NFJDR subbasin	Granite Creek Watershed	Upper NFJDR Watershed
Water Quality	Temperature	N	R	R
	Sediment	R	R	R
	Chem/Cont.	A	R	R
Access	Physical barriers	A	R	U
Habitat Elements	Substrate Embededness	R	R	N
	Large Woody Debris	R	R	R
	Pool Freq./Quality	R	R	N
	Large Pools	A	A	A
	Off Channel Habitat	A	A	A
	Refugia	R	U	U
Channel Conditions & Dynamics	Width/depth ratios	R	U	U
	Streambank Condition	R	A	R
	Floodplain connectivity	R	N	U
Flow/ Hydrology	Change in Peak Base Flow	R	U	U
	Drainage Network Increase	R	R	R
Watershed Condition	Road Density and Location	N	U	A
	Disturbance History	A	A	U
	RHCAs	R	R	U

* The condition of each MPI parameter is indicated in the following manner:
A= properly functioning, R= functioning at risk, N= not properly functioning, U=data unavailable

Pacific salmon and steelhead populations are substantially affected by variation in the freshwater and marine environments. Ocean conditions are a key factor in the productivity of Pacific salmon populations. Stochastic events in freshwater (flooding, drought, snowpack conditions, volcanic eruptions, *etc.*) can play an important role in a species' survival and recovery, but those effects tend to be localized compared to the effects associated with the ocean. The survival and recovery of these species depends on their ability to persist through periods of low natural survival due to ocean conditions, climatic conditions, and other conditions outside the action area. Freshwater survival is particularly important during these periods because enough smolts must be produced so that a sufficient number of adults can survive to complete their oceanic migration, return to spawn, and perpetuate the species. Therefore it is important to maintain or restore essential freshwater habitat features to sustain the ESU through these periods. Additional details about the importance of freshwater survival to Pacific salmon populations can be found in Federal Caucus (2000), NOAA Fisheries (2000), and Oregon Progress Board (2000).

2.1.5 Analysis of Effects

Effects of the action are defined as: "The direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with the action, that will be added to the environmental baseline" (50 CFR 402.02). Direct effects occur at the Project site and may extend upstream or downstream based on the potential for impairing the value of habitat for meeting the species' biological requirements. Indirect effects are defined in 50 CFR 402.02 as "those that are caused by the proposed action and are later in time, but still are reasonably certain to occur." They include the effects on listed species or habitat of future activities that are induced by the proposed action and that occur after the action is completed. "Interrelated actions are those that are part of a larger action and depend on the larger action for their justification" (50 CFR 402.02). "Interdependent actions are those that have no independent utility apart from the action under consideration" (50 CFR 402.02). The analysis of effect for this consultation will also consider the aggregate effects of the interdependent action of replacing the bridge that crosses the NFJDR.[4]

In the jeopardy analysis, NOAA Fisheries evaluates the effects of proposed actions on listed species and seeks to answer the question of whether the species can be expected to survive with an adequate potential for recovery.

Activities Involving In-water Work

The WWNF determined that the two activities involving in-water and near-water construction (replacement of drainage structures and culverts) are LAA MCR steelhead. These activities will require instream operation of heavy machinery and will produce sediment plumes sufficient to cause harm or harassment of MCR steelhead.

Potential impacts to listed salmonids from these proposed activities include both direct and indirect effects. There is some chance that fish will be crushed or injured during removal and

[4] See Section 1.1 of this document for further explanation.

replacement of the culvert structures, although the overall risk is low. Potential direct effects include mortality from exposure to suspended sediments (turbidity) and contaminants resulting for construction. Potential indirect effects include behavioral changes resulting from elevated turbidity level (Sigler *et al.* 1984, Berg and Northcote 1985, Whitman *et al.* 1982, Gregory 1988) during in-water construction.

Isolate Construction from Stream Flow

The capture, transport, and release of ESA-listed fish, if needed, will cause short-term stress and occasional mortality. Effects of stocking captured fish into a nearby habitat may lead to competitive interactions with fish residing at the site and in some cases can lead to predation on the disoriented fish being released.

Suspended sediment and turbidity influences on fish reported in the literature range from beneficial to detrimental. Elevated total suspended solids (TSS) conditions have been reported to enhance cover conditions, reduce piscivorus fish/bird predation rates, and improve survival. Elevated TSS conditions have also been reported to cause physiological stress, reduce growth, and adversely affect survival. Of key importance in considering the detrimental effects of TSS on fish are the frequency and the duration of the exposure, not just the TSS concentration.

Behavioral avoidance of turbid waters may be one of the most important effects of suspended sediments (DeVore *et al.* 1980, Birtwell *et al.* 1984, Scannell 1988). Salmonids have been observed to move laterally and downstream to avoid turbid plumes (McLeay *et al.* 1984, 1987, Sigler *et al.* 1984, Lloyd 1987, Scannell 1988, Servizi and Martens 1991). Juvenile salmonids tend to avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, unless the fish need to traverse these streams along migration routes (Lloyd *et al.* 1987). In addition, a potentially positive reported effect is providing refuge and cover from predation (Gregory and Levings 1998).

Fish that remain in turbid, or elevated TSS, waters experience a reduction in predation from piscivorus fish and birds (Gregory and Levings 1998). In systems with intense predation pressure, this provides a beneficial trade off (*e.g.*, enhanced survival) to the cost of potential physical effects (*e.g.*, reduced growth). Turbidity levels of about 23 Nephalometric Turbidity Units (NTU) have been found to minimize bird and fish predation risks (Gregory 1993). Exposure duration is a critical determinant of the occurrence and importance of physical or behavioral effects (Newcombe and MacDonald 1991). Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such high pulse exposures. Adult and larger juvenile salmonids may be little affected by the high concentrations of suspended sediments that occur during storm and snowmelt runoff episodes (Bjornn and Reiser 1991). However, research shows that chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth (Redding *et al.* 1987, Lloyd 1987, Servizi and Martens 1991).

Turbidity, at moderate levels, has the potential to adversely affect primary and secondary productivity, and at high levels, has the potential to injure and kill adult and juvenile fish, and may also interfere with feeding (Spence *et al.* 1996). Newly-emerged salmonid fry may be vulnerable to even moderate amounts of turbidity (Bjornn and Reiser 1991). Other behavioral effects on fish, such as gill flaring and feeding changes, have been observed in response to pulses of suspended sediment (Berg and Northcote 1985). Fine, redeposited sediments also have the potential to adversely affect primary and secondary productivity (Spence *et al.* 1996), and to reduce incubation success (Bell 1991) and cover for juvenile salmonids (Bjornn and Reiser 1991).

Increased sedimentation may also lead to increased embeddness of spawning substrates downstream of the project. Instream work scheduled for these projects will take place during the in-water work window for the area (July 15 to August 15). Due to the typically low flows present in the individual project areas during this time, sedimentation rates are expected to be minimal. Disturbance of riparian vegetation could result from operation of heavy machinery near the stream and could lead to decreased shade, increased water temperatures, and decreased streambank stability until riparian vegetation is re-established. Additionally, removal of hazard trees in riparian areas could result in a minor reduction in stream shading.

There is also the potential for fuel or other contaminant spills associated with use of heavy equipment in or near the stream. As with all construction activities, accidental release of fuel, oil, and other contaminants may occur. Operation of the backhoes, excavators, and other equipment requires the use of fuel, lubricants, *etc.*, which, if spilled into the channel of a waterbody or into the adjacent riparian zone, can injure or kill aquatic organisms. Petroleum-based contaminants, such as fuel, oil, and some hydraulic fluids, contain polycyclic aromatic hydrocarbons (PAHs), which can be acutely toxic to salmonids at high levels of exposure and can also cause chronic lethal and acute and chronic sublethal effects to aquatic organisms (Neff 1985).

Excavation in the stream channel associated with the drainage structure replacements will elevate the risk for chemical contamination of the aquatic environment within the action area. Because the potential for chemical contamination should be localized and brief, the probability of direct mortality is negligible. In-water work timing during the preferred in-water work period of July 15 through August 15 will minimize the risk from chemical contamination during in-water work activities. The contractor would also be required to develop, implement, and monitor a site-specific pollution control plan in an effort to further minimize risk to the aquatic environment.

Water drafting for road constructions activities from streams during the low flow periods of summer is reasonably certain to result in come adverse effects to rearing juvenile MCR steelhead. Short-term reductions in flow may cause fish relocate to areas of greater water depth or strand fish in residual pools. Once these fish move from cover they become susceptible to predation from birds, piscivorus fish, and mammals. In streams where multiple draftings occur

in a day, temperature increases may result from reduced flows. Screens on pumps used for water drafting will prevent juvenile fish from being entrained during water withdrawal.

These adverse effects are expected to be temporary and of short duration. The maximum period of time during which construction activities will occur is one month. In the long term, all aquatic habitat factors will be maintained. Some improvement in fish passage will occur at the site of culvert replacements. All habitat indicators are expected to be maintained or improved in the long term.

Effects of Bridge Replacement

The effects of the bridge replacement are described in detail in the biological opinion on proposed and ongoing Forest Service and Bureau of Land Management (BLM) activities in the NFJDR subbasin (NOAA Fisheries Nos.: 2000/01495, regarding "not likely to adversely affect" actions), and 2000/01496, regarding "likely to adversely affect" actions). The adverse effects to MCR steelhead from replacing the bridge on FR 73, that crosses the NFJDR, will be similar to those described above and include harassment of fish during instream work, turbidity, and minor sedimentation. These effects are expected to be temporary and of short duration. Due to the distance between the culvert replacements and the bridge replacement, overlapping areas of turbidity are not expected. The maximum period of time during which construction activities will occur is one month. In the long term, all aquatic habitat factors will be maintained. The replacement of the bridge on FR 73 will allow for more natural stream morphology at the site by reducing the amount of constriction the stream channel is experiencing. All habitat indicators at the bridge replacement site are expected to be maintained or improved in the long term. When the effects of the bridge replacement are added to the effects of the culvert replacements and other road reconstruction activities, they are not expected to result in population-level effects to MCR steelhead habitat.

2.1.6 Cumulative Effects

"Cumulative effects" are defined in 50 CFR 402.02 as those effects of "future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation."

BAs provided by the Forest Service for the NFJDR identify road building and maintenance, timber harvest, mining, livestock grazing, agricultural, recreation and tourism, and water use and control as non-federal actions that are reasonably certain to occur within the action area. It identifies risks to MCR steelhead from these activities as being either low, moderate, or high. The actions that were rated having a high risk to MCR steelhead were road building and maintenance, timber harvest, mining, livestock grazing, and agriculture. It was noted that effects from recreation and tourism were "limited for the most part" while water use and control was not rated. The primary rationale behind the high ratings was the lack of Federal regulatory control over these activities and the uncertainty about the potential effects that might be caused by these activities.

Recreational fishing for adult MCR steelhead occurs throughout the NFJDR subbasin. ODFW regulations limit the fishing season and require all wild MCR steelhead to be released unharmed. However, hooking mortality and injury occurs with some fish that are caught by anglers. The same situation exists for juvenile MCR steelhead throughout the subbasin, as there is no way for anglers to distinguish them from the resident rainbow trout for which they are legally fishing. In addition to mining that occurs on Federal lands in the action area, there is also a significant amount of mining occurring on private lands throughout the watersheds of the NFJDR subbasin. The Granite Creek watershed includes the Alamo Mining District which is characterized by many placer and lode mines. The extent of private mining actions is not specifically analyzed in the BA, but field reviews by NOAA Fisheries biologists suggest that a significant amount of private land mining activity still takes place.

Another non-federally regulated activity that takes place in the Granite Creek and the Upper NFJDR watershed is small-scale, recreational suction dredging. The extent of these activities is not referenced in the BA. Although this activity is regulated by the State of Oregon, it can still have adverse effects to MCR steelhead or their habitat. One potential effect from recreational dredging is the destabilization of riffles and the filling of pools (Harvey and Lisle, 1998). The presence of a small number of recreational dredges would not likely disrupt stream processes, but the combined effects of a large number of recreational dredges operating in a stream during a single season could have significant adverse effects.

Significant improvement in MCR steelhead reproductive success outside of federally-administered land is unlikely without changes in mining, grazing, agricultural, and other practices occurring within these non-federal riparian areas in the NFJDR subbasin. Until improvements in non-federal land management practices are actually implemented, NOAA Fisheries assumes that future private and state actions will continue at similar intensities as in recent years.

2.1.7 Conclusion

NOAA Fisheries has determined that, when the effects of the subject action addressed in this Opinion are added to the environmental baseline and cumulative effects occurring in the action area, they are not likely to jeopardize the continued existence of MCR steelhead.

NOAA Fisheries believes that the proposed action will cause some minor, short-term increases in stream turbidity and sedimentation rates in the action area. It is also possible that some mortality of juvenile MCR steelhead may result from the instream work as well as the work area isolation operations. Water drafting is likely to result in some harassment of juvenile MCR steelhead. Vegetation disturbance or removal is expected to result in a temporary decrease in shade, as well as some behavior modification in the form of avoidance of areas without sufficient cover. These effects will diminish over time as newly-planted riparian vegetation is established. MCR steelhead are expected to avoid habitats negatively affected by construction activities in the short term until conditions improve. The proposed action is expected to provide long-term benefits to MCR steelhead through improving habitat access.

NOAA Fisheries' conclusions are based on the following considerations: (1) All instream work will occur during the in-water work window for this area of July 15 to August 15, and instream work will be limited to the amount described in the BA; (2) all disturbed soils will be replanted with native vegetation; (3) a small net increase in fish habitat access will result from the proposed action; and (4) no adverse synergistic effects of the bridge replacement are expected. Thus, the proposed action is not expected to impair properly functioning habitats, appreciably reduce the functioning of already impaired habitats, or retard the long-term progress of impaired habitats toward proper functioning condition essential to the long-term survival and recovery at the population or ESU scale.

2.1.8 Reinitiation of Consultation

As provided in 50 CFR 402.16, reinitiation of formal consultation is required if: (1) The amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; (3) the action is modified in a way that causes an effect on listed species that was not previously considered; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease, pending conclusion of the reinitiated consultation. To reinitiate consultation, the WWNF must contact the Habitat Conservation Division of NOAA Fisheries, Oregon State Habitat Office and refer to NOAA Fisheries No.: 2004/0008.

2.2 Incidental Take Statement

The ESA at section 9 [16 USC 1538] prohibits take of endangered species. The prohibition of take is extended to threatened anadromous salmonids by section 4(d) rule [50 CFR 223.203]. Take is defined by the statute as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" [16 USC 1532(19)]. Harm is defined by regulation as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering" [50 CFR 222.102]. Harass is defined as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering" [50 CFR 17.3]. Incidental take is defined as "takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant" [50 CFR 402.02]. The ESA at section 7(o)(2) removes the prohibition from any incidental taking that is in compliance with the terms and conditions specified in a section 7(b)(4) incidental take statement [16 USC 1536].

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to

minimize impacts and sets forth terms and conditions with which the action agency must comply to implement the reasonable and prudent measures.

2.2.1 Amount or Extent of the Take

The proposed action is reasonably certain to result in incidental take of juvenile MCR steelhead. NOAA Fisheries is reasonably certain the incidental take described here will occur because: (1) The listed species are known to occur in the action area; and (2) the proposed action is likely to cause impacts significant enough to cause death or injury, or impair feeding, breeding, migrating, or sheltering for the listed species.

Some level of incidental take is expected to result from direct injury or death of juvenile MCR steelhead during instream work. There is a small chance that fish may be killed or injured while the culvert structures are being removed or replaced. The temporary increase in sediment and turbidity is expected to cause fish to avoid disturbed areas of the stream, both within and downstream of the Project area. Effects from turbidity are expected to be of short duration, because turbidity levels will quickly return to preconstruction levels once instream work is completed. Incidental take is also likely if toxicants are introduced into the water. Take in the form of behavior modification (avoidance) is expected from riparian disturbance, vegetation removal, and decreased shade. This take is expected to be reduced as newly-planted riparian vegetation is established. Some take in the form of harm is likely to result from water drafting especially if stream flows are low during the construction period.

Because of the inherent biological characteristics of aquatic species such as MCR steelhead, the likelihood of discovering take attributable to this action is very limited. Take associated with the effects of actions such as these are largely unquantifiable in the short term, and may not be measurable as long-term effects on the species' habitat or population levels. Therefore, although NOAA Fisheries expects the habitat-related effects of these actions to cause some low level incidental take, the best scientific and commercial data available are not sufficient to enable NOAA Fisheries to estimate a specific amount of incidental take because of those habitat-related effects. In instances such as these, NOAA Fisheries designates the expected level of take as "unquantifiable."

2.2.2 Effect of Take

In this Opinion, NOAA Fisheries determines that this level of anticipated take is not likely to result in jeopardy to MCR steelhead.

2.2.3 Reasonable and Prudent Measures

NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of the above species. Minimizing the amount and extent of take is essential to avoid jeopardy to the listed species. The WWNF in respect to their proposed or ongoing activities addressed in this Opinion, shall:

1. Minimize the amount and extent of incidental take resulting from general construction activities, riparian disturbance, and in-water work required to complete the proposed Project addressed in this Opinion.

2. Minimize the likelihood of incidental take from contaminant leaks and spills associated with the use of heavy equipment.

3. Minimize the amount and extent of incidental take of work area isolation.

4. Monitor the effects of the proposed action to determine the actual Project effects on listed fish (50 CFR 402.14 (i)(3)). Monitoring should detect adverse effects of the proposed action, assess the actual levels of incidental take in comparison with anticipated incidental take documented in this Opinion, and detect circumstances where the level of incidental take is exceeded.

2.2.4 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the action must be implemented in compliance with the following terms and conditions, which implement the reasonable and prudent measures described above for each category of activity. These terms and conditions are non-discretionary.

1. To implement reasonable and prudent measure #1 (general construction, riparian disturbance, and in-water work), the WWNF shall ensure that:

    a. Minimum area. Confine construction impacts to the minimum area necessary to complete the Project.
    b. Timing of in-water work. Work below the bankfull elevation[5] will be completed using the in-water work period of presently July 15 to August 15, as appropriate for the Project area, unless otherwise approved in writing by NOAA Fisheries.
    c. Cessation of work. Cease Project operations under high flow conditions that may result in inundation of the Project area, except for efforts to avoid or minimize resource damage.
    d. Preconstruction activity. Complete the following actions before significant[6] alteration of the Project area.
        i. Marking. Flag the boundaries of clearing limits associated with site access and construction to prevent ground disturbance of critical riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.

[5] 'Bankfull elevation' means the bank height inundated by a 1.5 to 2-year average recurrence interval and may be estimated by morphological features such average bank height, scour lines and vegetation limits.

[6] 'Significant' means an effect can be meaningfully measured, detected or evaluated.

ii. Emergency erosion controls. Ensure that a supply of sediment control materials (*e.g.*, silt fence, straw bales[7]) for emergency erosion control are onsite.

iii. Temporary erosion controls. All temporary erosion controls will be in-place and appropriately installed downslope of Project activity within the riparian area until site restoration is complete.

iv. General erosion control. Practices to prevent erosion and sedimentation associated with access roads, stream crossings, drilling sites, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations, staging areas, and roads being decommissioned.

v. Inspection of erosion controls. During construction, monitor instream turbidity and inspect all erosion controls daily during the rainy season and weekly during the dry season, or more often as necessary, to ensure the erosion controls are working adequately.[8]

(1) If monitoring or inspection shows that the erosion controls are ineffective, mobilize work crews immediately to make repairs, install replacements, or install additional controls as necessary.

(2) Remove sediment from erosion controls once it has reached 1/3 of the exposed height of the control.

e. Heavy equipment. When heavy equipment will be used, the equipment selected will have the least adverse effects on the environment (*e.g.*, minimally-sized, low ground pressure equipment).

f. Site preparation. Conserve native materials for site restoration.

i. If possible, leave native materials where they are found.

ii. If materials are moved, damaged or destroyed, replace them with a functional equivalent during site restoration.

iii. Stockpile any large wood,[9] native vegetation, weed-free topsoil, and native channel material displaced by construction for use during site restoration.

g. Earthwork. Complete earthwork (including drilling, excavation, dredging, filling and compacting) as quickly as possible.

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[7] When available, certified weed-free straw or hay bales will be used to prevent introduction of noxious weeds.

[8] 'Working adequately' means that Project activities do not increase ambient stream turbidity by more than 10% above background 100 feet below the discharge, when measured relative to a control point immediately upstream of the turbidity causing activity.

[9] For purposes of this Opinion only, 'large wood' means a tree, log, or rootwad big enough to dissipate stream energy associated with high flows, capture bedload, stabilize streambanks, influence channel characteristics, and otherwise support aquatic habitat function, given the slope and bankfull channel width of the stream in which the wood occurs. See, Oregon Department of Forestry and Oregon Department of Fish and Wildlife, *A Guide to Placing Large Wood in Streams*, May 1995 (www.odf.state.or.us/FP/RefLibrary/LargeWoodPlacemntGuide5-95.doc).

i. Site stabilization. Stabilize all disturbed areas following any break in work unless construction will resume within four days.

ii. Source of materials. Obtain boulders, rock, woody materials and other natural construction materials used for the Project outside the riparian area.

h. Water drafting. Water drafting will be conducted with following protective measures.

i. Water source. Non-stream sources will be used before the use of streams sources whenever feasible. When non-stream sources are unavailable, streams with the greatest flow will be used whenever feasible.

ii. Stream flow. Water withdrawal will not reduce stream flow by more than $1/10^{th}$. For pumps with adjustable pump rates, pumping rates will be adjusted to avoid drafting more than $1/10^{th}$ of the current stream flow.

iii. Volume removed. If streams with less than 5 cfs are used for drafting, no more than 18,000 gallons will be removed in one day.

iv. Number of pumps. If streams with less than 5 cfs are used for drafting, no more than one pump will operate at one time at any one drafting site.

v. Adult fish. No water will be drafted from sites where adult salmonids are visibly present to prevent interference with spawning activities. If redds have been downstream of drafting sites, a WWNF fish biologist will ensure water drafting will not have adverse effects to eggs or emergent alevins.

2. To implement reasonable and prudent measure #2 (pollution control), the WWNF shall ensure that:

a. Pollution control plan. Prepare and carry out a pollution and erosion control plan to prevent pollution caused by surveying or construction operations. The plan must be available for inspection on request by NOAA Fisheries.

i. Plan contents. The pollution and erosion control plan will contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.

(1) The name and contact information of the party(s) responsible for accomplishment of the pollution and erosion control plan.

(2) Practices to confine, remove and dispose of excess concrete, cement, grout, and other mortars or bonding agents, including measures for washout facilities.

(3) A description of any regulated or hazardous products or materials that will be used for the Project, including procedures for inventory, storage, handling, and monitoring.

(4) A spill containment and control plan with notification procedures, specific cleanup and disposal instructions for different products, quick response containment and cleanup measures that will be

available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.

(5) Practices to prevent construction debris from dropping into any stream or waterbody, and to remove any material that does drop with a minimum disturbance to the streambed and water quality.

ii. Vehicle and material staging. Store construction materials, and fuel, operate, maintain and store vehicles as follows.

(1) To reduce the staging area and potential for contamination, ensure that only enough supplies and equipment to complete a specific job will be stored on-site.

(2) Complete vehicle staging, cleaning, maintenance, refueling, and fuel storage in a vehicle staging area placed outside of any riparian areas, unless otherwise approved in writing by NOAA Fisheries.

(3) Inspect all vehicles operated within an riparian areas daily for fluid leaks before leaving the vehicle staging area. Repair any leaks detected in the vehicle staging area before the vehicle resumes operation. Document inspections in a record that is available for review on request by NOAA Fisheries.

(4) Before operations begin and as often as necessary during operation, steam clean all equipment that will be used below bankfull elevation until all visible external oil, grease, mud, and other visible contaminates are removed.

(5) Diaper all stationary power equipment (*e.g.*, generators, cranes, stationary drilling equipment) operated within any riparian area to prevent leaks, unless suitable containment is provided to prevent potential spills from entering any stream or waterbody.

b. Floating boom. An oil-absorbing, floating boom whenever surface water is present.

c. Construction discharge water. Treat all discharge water created by construction (*e.g.*, concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) as follows.

i. Pollutants. Do not allow pollutants including green concrete, contaminated water, silt, welding slag, sandblasting abrasive, or grout cured less than 24 hours to contact any wetland or the two-year floodplain.

3. To implement reasonable and prudent measure #3 (work area isolation), the WWNF shall:

a. Isolation of in-water work area. If adult or juvenile MCR steelhead are reasonably certain to be present, completely isolate the work area from the active flowing stream using inflatable bags, sandbags, sheet pilings, or similar materials, unless otherwise approved in writing by NOAA Fisheries.

b. Capture and release. Before and intermittently during pumping to isolate an in-water work area, attempt to capture and release fish from the isolated area using

trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury.

i. The entire capture and release operation must be conducted or supervised by a fishery biologist experienced with work area isolation and competent to ensure the safe handling of all ESA-listed fish.
ii. Do not use electrofishing if water temperatures exceed 18°C.
iii. If electrofishing equipment is used to capture fish, comply with NOAA Fisheries' electrofishing guidelines.[10]
iv. Handle ESA-listed fish with extreme care, keeping fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.
v. Transport fish in aerated buckets or tanks.
vi. Release fish into a safe release site as quickly as possible, and as near as possible to capture sites.
vii. Do not transfer ESA-listed fish to anyone except NOAA Fisheries personnel, unless otherwise approved in writing by NOAA Fisheries.
viii. Obtain all other Federal, state, and local permits necessary to conduct the capture and release activity.
ix. Allow NOAA Fisheries or its designated representative to accompany the capture team during the capture and release activity, and to inspect the team's capture and release records and facilities.

4. To implement reasonable and prudent measure #4 (monitoring), the WWNF shall:

a. Reporting. Within one year of Project completion, the WWNF will submit a monitoring report to NOAA Fisheries describing the WWNF's success in meeting the terms and conditions contained in this Opinion.

-or-

Include the following information in a Forest-wide monitoring report.

In either case, include the following information:

i. Project identification
(1) Project name.
(2) Type of activity.
(3) Project location, by 5th field HUC and by latitude and longitude as determined from the appropriate USGS 7-minute quadrangle map.
(4) WWNF contact person.
(5) Starting and ending dates for work completed.

[10] National Marine Fisheries Service, *Backpack Electrofishing Guidelines* (December 1998) (http://www.nwr.noaa.gov/1salmon/salmesa/pubs/electrog.pdf).

ii. Photo documentation. Photos of habitat conditions at the project and any compensation site(s), before, during, and after project completion.[11]
    (1) Include general views and close-ups showing details of the project and Project area, including pre and post construction.
    (2) Label each photo with date, time, project name, photographer's name, and a comment about the subject.

iii. Other data. Additional project-specific data, as appropriate.
    (1) Work cessation. Dates work ceased due to high flows, if any.
    (2) Fish screen. Evidence of compliance with NOAA Fisheries' fish screen criteria.
    (3) Pollution control. A summary of pollution and erosion control inspections, including any erosion control failure, contaminant release, and correction effort.
    (4) Site preparation.
        (a) Total cleared area – riparian and upland.
        (b) Total new impervious area.
    (5) Streambank protection.
        (a) Type and amount of materials used.
        (b) Project size – one bank or two, width and linear feet.
    (6) Site restoration. Photo or other documentation that site restoration performance standards were met.
    (7) Long-term habitat loss. The same elements apply as for monitoring site restoration.

b. Effectiveness monitoring. Gather any other data or analyses the WWNF deems necessary or helpful to complete an assessment of habitat trends in stream and riparian conditions as a result of this project. The WWNF may use existing monitoring efforts for this purpose if those efforts can provide information specific to the objective of identifying habitat trends.

c. Lethal take. If a sick, injured, or dead specimen of a threatened or endangered species is found, the finder must notify the Vancouver Field Office of NOAA Fisheries Law Enforcement at (360) 418-4246. The finder must take care in handling sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

d. Report submission. Submit a copy of the report to the Oregon State Habitat Office of NOAA Fisheries.

[11] Relevant habitat conditions may include characteristics of channels, eroding and stable streambanks in the Project area, riparian vegetation, water quality, flows at base, bankfull and over-bankfull stages, and other visually discernable environmental conditions at the Project area, and upstream and downstream of the Project.

Director, Oregon State Habitat Office
Habitat Conservation Division
National Marine Fisheries Service
Attn: 2004/0008
525 NE Oregon Street
Portland, OR 97232

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires the inclusion of EFH descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NOAA Fisheries on activities that would adversely affect EFH.

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting the definition of EFH: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.110).

Section 305(b) of the MSA (16 U.S.C. 1855(b)) requires that:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH;

- NOAA Fisheries shall provide conservation recommendations for any Federal or state Activity that may adversely affect EFH;

- Federal agencies shall within 30 days after receiving conservation recommendations from NOAA Fisheries provide a detailed response in writing to NOAA Fisheries regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency shall explain its reason for not following the recommendations.

The MSA requires consultation for all actions that may adversely affect EFH, and does not distinguish between actions within EFH and actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities, that may have an adverse effect on EFH. Therefore, EFH consultation with NOAA Fisheries is required by Federal agencies undertaking, permitting or funding activities that may adversely affect EFH, regardless of its location.

3.2 Identification of EFH

The Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Pacific salmon: Chinook (*Oncorhynchus tshawytscha*); coho (*O. kisutch*); and Puget Sound pink salmon (*O.gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other waterbodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (*e.g.*, natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the *Pacific Coast Salmon Plan* (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based on this information.

3.3 Proposed Actions

The proposed action is detailed above in Section 1.2 of the ESA portion of this Opinion. The action area includes watersheds within the NFJDR subbasin. This area has been designated as EFH for various life stages of chinook salmon.

3.4 Effects of Proposed Action

The effects on chinook and coho salmon are the same as those for MCR steelhead and are described in detail in Section 2.2.1 of this document, the proposed action may result in short-term and long-term adverse effects on a variety of habitat parameters. These adverse effects are:

1. Riparian disturbance from accessing construction area and construction activities performed from the bank.
2. Increased sedimentation from instream construction activities.

3.5 Conclusion

NOAA Fisheries believes that the proposed action will adversely affect EFH for chinook salmon.

3.6 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations for any Federal or state agency action that may adversely affect

EFH. In addition to conservation measures proposed for the project by the WWNF, all of the reasonable and prudent measures and the terms and conditions contained in sections 2.2.3 and 2.2.4 (respectively) of the ESA portion of this Opinion are applicable to salmon EFH. Therefore, NOAA Fisheries incorporates each of those measures here as EFH conservation recommendations.

3.7 Statutory Response Requirement

The MSA (section 305(b)) and 50 CFR 600.920(j) requires the WWNF to provide a written response to NOAA Fisheries' EFH conservation recommendations within 30 days of its receipt of this letter. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. If the response is inconsistent with NOAA Fisheries' conservation recommendations, the WWNF shall explain its reasons for not following the recommendations.

3.8 Supplemental Consultation

The WWNF must reinitiate EFH consultation with NOAA Fisheries if either the action is substantially revised or new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920).

4. REFERENCES

Bell, M.C. 1991. Fisheries handbook of Engineering requirements and biological criteria. Fish Passage Development and Evaluation Program. U.S. Army Corps of Engineers. North Pacific Division.

Berg, L. and T.G. Northcote. 1985. "Changes In Territorial, Gill-Flaring, and Feeding Behavior in Juvenile Coho Salmon (*Oncorhynchus kisutch*) Following Short-Term Pulses of Suspended Sediment." Canadian Journal of Fisheries and Aquatic Sciences 42:1410-1417.

Birtwell, I. K., G. F. Hartman, B. Anderson, D. J. McLeay and J. G. Malick. 1984. A brief investigation of Arctic Grayling (*Thymallus arcticus*) and aquatic invertebrates in the Minto Creek drainage, Mayo, Yukon Territory: an area subjected to placer mining. Canadian Technical Report of Fisheries and Aquatic Sciences 1287.

Bisson, P. A., G. H. Reeves, R. E. Bilby and R. J. Naiman. 1997. Watershed Management and Pacific Salmon: Desired Future Conditions. P. 447-474. In: Stouder, D.J., P.A. Bisson, and R.J. Naiman, eds. Pacific Salmon and Their Ecosystems: Status and Future Options. Chapman and Hall, New York.

Bjorn, T.C., and D.W. Reiser. 1991. Habitat requirements of salmonids in streams. Pages 83-138, in W.R. Meehan (editor) Influences of forest and rangeland management on salmonid fishes and their habitats. Special Publication 19. American Fisheries Society, Bethesda, Maryland.

Busby, P., T. Wainwright, G.J. Bryant, L.J. Lierheimer, R.S. Waples, and I.V. Lagomarsino. 1996. Status review of west coast steelhead from Washington, Idaho, Oregon, and California.

Coutant, C.C. 1999. Perspectives on Temperature in the Pacific Northwest's Fresh Waters. Environmental Sciences Division Publication 4849 (ORNL/TM-1999/44), Oak Ridge National Laboratory, Oak Ridge, Tennessee. 108 p.

DEQ 2003. DEQ's 2003 303d List of Water Quality Limited Streams & Oregon's Criteria Used for Listing Waterbodies. Oregon Department of Environmental Quality (DEQ), Portland, Oregon. (http://www.deq.state.or.us/wq/303dlist/303dpage.htm).

DeVore, P. W., L. T. Brooke and W. A. Swenson. 1980. The effects of red clay turbidity and sedimentation on aquatic life in the Nemadji River system. Impact of nonpoint pollution control on western Lake Superior. S. C. Andrews, R. G. Christensen, and C. D. Wilson. Washington, D.C., U.S. Environmental Protection Agency. EPA Report 905/9-79-002-B.

Federal Caucus. 2000. Conservation of Columbia Basin Fish: Final Basinwide Salmon Recovery Strategy. <http://www.salmonrecovery.gov> December.

Gregory, R.S. 1993. Effect of turbidity on the predator avoidance behavior of juvenile chinook salmon (*Oncorhynchus tshawytscha*). Canadian J. Fish. Aquatic Sciences 50:241-246.

Gregory, R.S., and C.D. Levings. 1998. Turbidity reduces predation on migrating juvenile pacific salmon. Transactions of the American Fisheries Society 127: 275-285.

Harvey, B.C. and T.E. Lisle. 1998. Effects of suction dredging on streams: a review and an evaluation strategy. Fisheries 23:8-17.

Henjum, M.G., J.R. Karr, D.L. Bottom, D.A. Perry, J.C. Bednarz, S.G. Wright, S.A. Beckwitt and E. Beckwitt. 1994. Interim Protection for Late-successional Forests, Fisheries and Watersheds. National Forests East of the Cascade Crest, Oregon and Washington. A Report to the United States Congress and the President. The Wildlife Society, Bethesda, MD.

Independent Scientific Group. 1996. Return to the River: Restoration of Salmonid Fishes in the Columbia River Ecosystem. Northwest Power Planning Council. Portland, Oregon. 500 p.

Lee, D. C., J. R. Sedell, B. E. Rieman, R. F. Thurow, and J. E. Williams. 1997. Broadscale Assessment of Aquatic Species and Habitats. Volume III, Chapter 4. U.S. For. Serv., Gen. Tech. Rep. PNW-GTR-405. Portland, Oregon.

Lloyd, D.S. 1987. Turbidity as a water quality standard for habitats in Alaska. North American Journal of Fisheries Management 7:34-35.

Lloyd, D. S., J. P. Koenings, and J. D. LaPerriere. 1987. Effects of turbidity in fresh waters of Alaska. North American Journal of Fisheries Management 7: 18-33.

Maser, Chris & James R. Sedell. 1994. From the Forest to the Sea: The Ecology of Wood in Streams, Rivers, Estuaries, and Oceans. St. Lucie Press, Delray Beach, Florida.

McElhany, P., M. Ruckleshaus, M. J. Ford, T. Wainwright, and E. Bjorkstedt. 2000. Viable Salmon Populations and the Recovery of Evolutionarily Significant Units. U. S. Dept. Commer., NOAA Technical Memorandum NMFS-NWFSC-42.

McIntosh, B.A., J.R. Sedell, J.E. Smith, R.C. Wissmar, S.E. Clarke, G.H. Reeves, and L.A. Brown. 1994. Management History of Eastside Ecosystems: Changes in Fish Habitat Over 50 Years, 1935 to 1992. USDA Forest Service, Pacific Northwest Research Station, General Technical Report PNW-GTR-321. February.

McLeay, D. J., G. L. Ennis, I. K. Birtwell, and G. F. Hartman. 1984. Effects On Arctic Grayling (*Thymallus arcticus*) of Prolonged Exposure to Yukon Placer Mining Sediment: A Laboratory Study. Canadian Technical Report of Fisheries and Aquatic Sciences 1241.

McLeay, D. J., I. K. Birtwell, G. F. Hartman, and G. L. Ennis. 1987. Responses of Arctic Grayling (*Thymallus arcticus*) To Acute and Prolonged Exposure to Yukon Placer Mining Sediment. Canadian Journal of Fisheries and Aquatic Sciences 44: 658-673

Naiman, R. J., T. J. Beechie, L. E. Benda, D. R. Berg, P. A. Bisson, L. H. MacDonald, M. D. O'Connor, P. L. Olson, and E. A. Steel. 1992. Fundamental Elements of Ecologically Healthy Watersheds in the Pacific Northwest Coastal Ecoregion. P. 127-188. In: R.S. Naiman, ed. Watershed Management — Balancing Sustainability and Environmental Change. Springer-Verlag, N.Y.

National Research Council. 1996. Upstream—Salmon and Society in the Pacific Northwest. National Academy Press, Washington, D.C.

Neff, J.M. 1985. Polycyclic aromatic hydrocarbons. *In*: Fundamentals of aquatic toxicology, G.M. Rand and S.R. Petrocelli, pp. 416-454. Hemisphere Publishing, Washington, D.C.

Nehlsen, W. 1997. Prioritizing Watersheds in Oregon for Salmon Restoration. Restoration Ecology 5(4S):25-43.

Newcombe, C. P., and D. D. MacDonald. 1991. Effects of Suspended Sediments on Aquatic Ecosystems." North American Journal of Fisheries Management 11: 72-82.

NOAA Fisheries 1996. Making Endangered Species Act Determinations of Effect for Individual and Grouped Actions at the Watershed Scale. Habitat Conservation Program, Portland, Oregon.

NOAA Fisheries (National Marine Fisheries Service) 1996b. Factors for decline: A supplement to the notice of determination for West Coast Steelhead under the Endangered Species Act. NOAA Fisheries, Protected Species Branch, Portland, Oregon, 83p. (Available from NOAA Fisheries Protected Resources Division, 525 N.E. Oregon Street, Portland, Oregon 97232).

NOAA Fisheries. 1997. Status Review Update for Deferred and Candidate ESUs of West Coast Steelhead. December. 62 p. (Available @ www.nwr.noaa.gov under Protected Resources Division, Status Reviews).

NOAA Fisheries 1999. The Habitat Approach. Implementation of Section 7 of the Endangered Species Act for Actions Affecting the Habitat of Pacific Anadromous Salmonids. Northwest Region, Habitat Conservation and Protected Resources Divisions, August 26.

NOAA Fisheries 1999b. Updated Review of the Status of the Upper Willamette River and Middle Columbia River ESUs of Steelhead (*Oncorhynchus mykiss*). January. 44 p. (Available @ www.nwr.noaa.gov under Protected Resources Division, Status Reviews).

NOAA Fisheries 2000. Biological Opinion -- Reinitiation of Consultation on Operation of the Federal Columbia River Power System, Including the Juvenile Fish Transportation Program, and 19 Bureau of Reclamation Projects in the Columbia Basin. Hydro Program, Portland, Oregon. (Issued December 21, 2000)

NOAA Fisheries (*in review*). 2003. Preliminary conclusions regarding the updated status of listed ESUs of West Coast salmon and steelhead. 142 pages. February. NOAA Fisheries, 525 NE Oregon Street, Suite 500, Portland, Oregon 97232-2737. (Available @ www.nwfsc.noaa.gov/)

Oregon Department of Fish and Wildlife (ODFW). 2000. Guidelines for Timing of Inwater Work to Protect Fish and Wildlife Resources, 12 pp. June 2000.

Oregon Progress Board. 2000. Oregon State of the Environment Report 2000. Oregon Progress Board, Salem, Oregon.

PFMC 1999. Amendment 14 to the Pacific Coast Salmon Plan. Appendix A: Description and Identification of Essential Fish Habitat, Adverse Impacts and Recommended Conservation Measures for Salmon. Pacific Fishery Management Council, Portland, Oregon.

Redding, J. M., C. B. Schreck, and F. H. Everest. 1987. Physiological Effects on Coho Salmon and Steelhead of Exposure to Suspended Solids. Transactions of the American Fisheries Society 116: 737-744.

Rhodes, J.J., D.A. McCullough, and F.A. Espinosa, Jr. 1994. A Coarse Screening Process for Potential Application in ESA Consultations. Columbia River Intertribal Fish Commission. Prepared under NOAA Fisheries/BIA Inter-Agency Agreement 40ABNF3. December.

Scannell, P.O. 1988. Effects of elevated sediment levels from placer mining on survival and behavior of immature arctic grayling. Alaska Cooperative Fishery Unit, University of Alaska. Unit Contribution 27.

Sedell, J.R. and J.L. Froggatt. 1984. Importance of Streamside Forests to Large Rivers: The Isolation of theWillamette River, Oregon, USA, from Its Floodplain by Snagging and Streamside Forest Removal. Internationale Vereinigung fur theoretische und angewandte Limnologie Verhandlungen 22:1828-1834.

Servizi, J. A. and Martens, D. W. 1991. Effects of temperature, season, and fish size on acute lethality of suspended sediments to coho salmon. Canadian Journal of Fisheries and Aquatic Sciences 48:493:497.

Sigler , J. W., T.C. Bjorn and F.H. Everest. 1984. Effects of chronic turbidity on density and growth of steelheads and coho salmon. Trans. Am. Fish. Soc. 111:63-69.

Spence, B.C, G.A. Lomnicky, R.M. Hughes, R.P. Novitzki. 1996. An Ecosystem Approach to Salmonid Conservation. TR-4501-96-6057. ManTech Environmental Research Services Corp., Corvallis, OR.

Unterwegner, T.J. and M.E. Gray. 1997. Annual Report, John Day Fish District, Northeast Region, 1997. Unpublished Report. Oregon Department of Fish and Wildlife. John Day, Oregon.

Wedemeyer, G.A., B.A. Barton, and D.J. McLeay. 1990. Stress and acclimation. Pages 451-490 *in* C.B. Schreck and P.B. Moyle, editors. Methods for fish biology. American Fisheries Society, Bethesda, Maryland.

Whitman, R.P., T.P. Quinn and E.L. Brannon. 1982. Influence of suspended volcanic ash on homing behavior of adult chinook salmon. Trans. Am. Fish. Soc. 113:142-150.

Wissmar, R.C., J.E. Smith, B.A. McIntosh, H.W. Li, G.H. Reeves, and J.R. Sedell. 1994. Ecological Health of River Basins in Forested Regions of Eastern Washington and Oregon. Gen. Tech. Rep. PNW-GTR-326. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. Portland, OR. 65 p.